#3

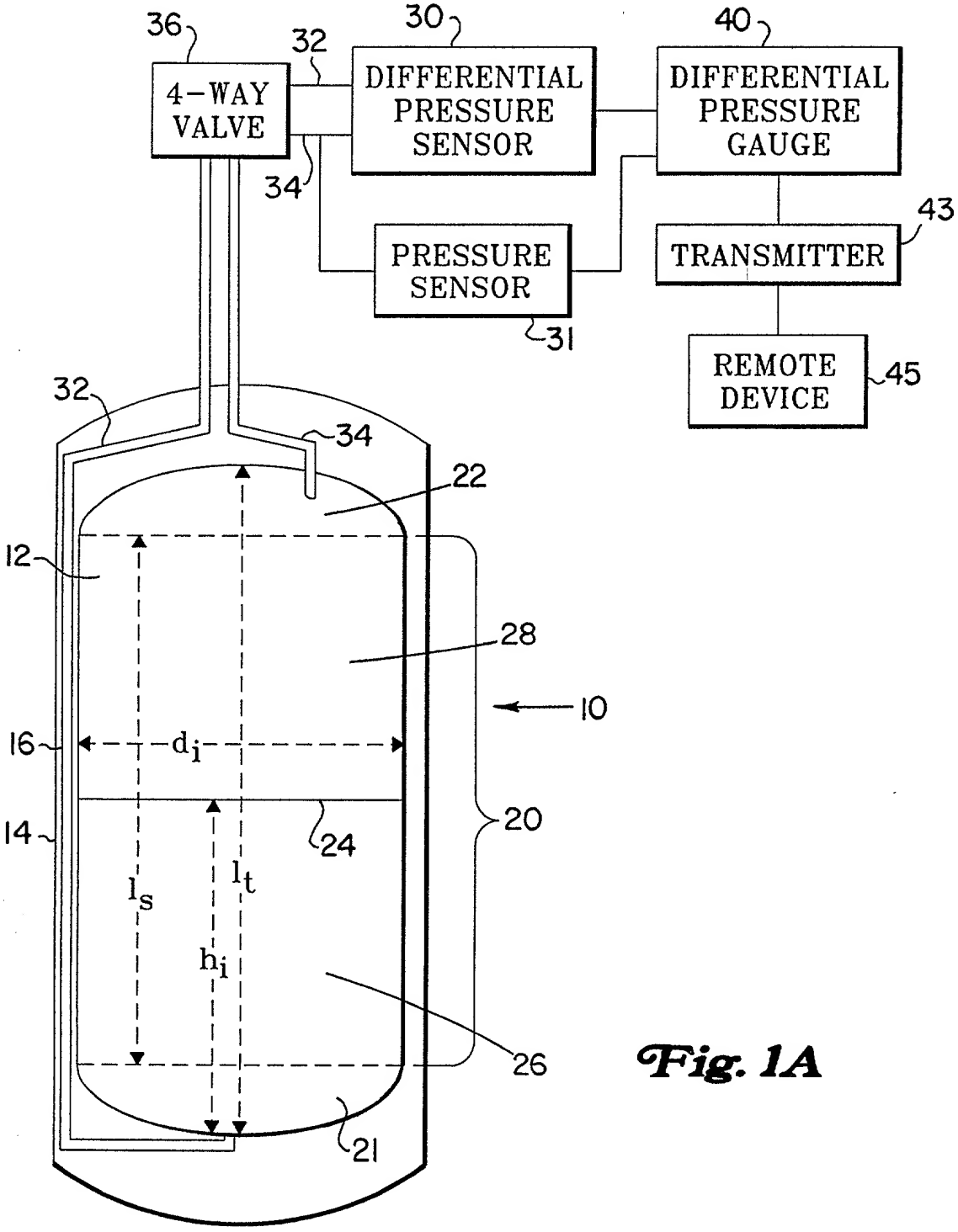

36
32
30
40
4-WAY VALVE
DIFFERENTIAL PRESSURE SENSOR
DIFFERENTIAL PRESSURE GAUGE
34
PRESSURE SENSOR
31
43
TRANSMITTER
REMOTE DEVICE
45
32
34
22
12
28
10
16
d_i
20
14
24
l_s
l_t
h_i
26
21

Fig. 1A

Fig. 1B

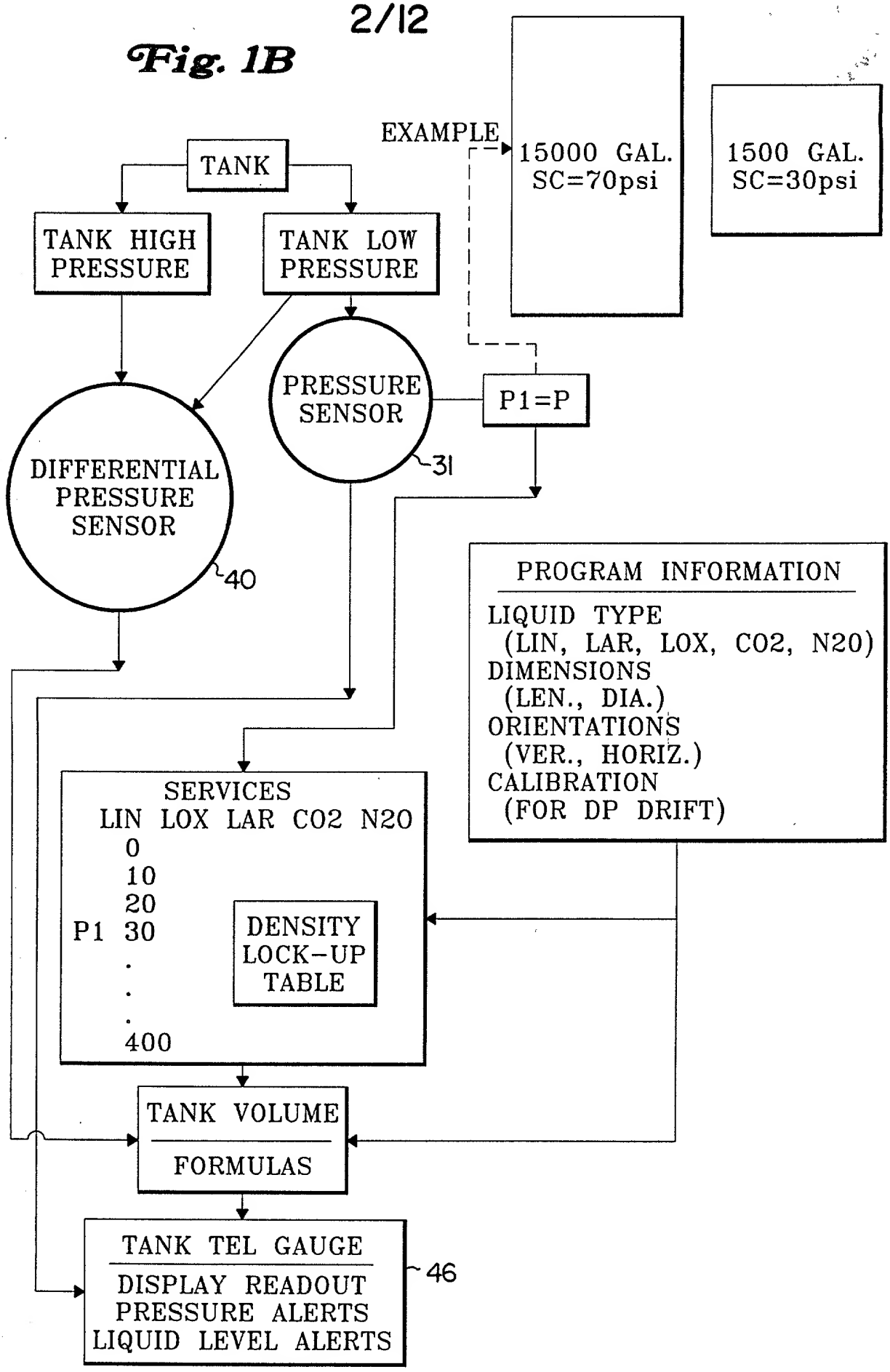

EXAMPLE
15000 GAL.
SC=70psi
1500 GAL.
SC=30psi
TANK
TANK HIGH PRESSURE
TANK LOW PRESSURE
PRESSURE SENSOR
31
P1=P
DIFFERENTIAL PRESSURE SENSOR
40
PROGRAM INFORMATION
LIQUID TYPE
(LIN, LAR, LOX, CO2, N20)
DIMENSIONS
(LEN., DIA.)
ORIENTATIONS
(VER., HORIZ.)
CALIBRATION
(FOR DP DRIFT)
SERVICES
LIN LOX LAR CO2 N20
0
10
20
P1 30
.
.
.
400
DENSITY LOCK-UP TABLE
TANK VOLUME
FORMULAS
TANK TEL GAUGE
DISPLAY READOUT
PRESSURE ALERTS
LIQUID LEVEL ALERTS
46

Fig. 1C

VESSEL	STRATIFICATION CONSTANT
VS-525	5
VS-900	5
VS-1500	10
VS-3000	10
VS-6000	15
VS-9000	15
VS-11000	20
VS-13000	30
VS-13000	40

PRESSURE=P INPUT-STRATIFICATION CONSTANT

PRESSURE: SATURATION PRESSURE USED FOR DENSITY CALCULATIONS

P INPUT: TANK PRESSURE AS TAKEN FROM PRESSURE SENSOR

STRATIFICATION CONSTANT: CORRECTION FACTOR, DETERMINED BY TANK HEIGHT, TO CORRECT SATURATION PRESSURE FOR STRATIFICATION IN TANK

NITROGEN	ARGON	OXYGEN	CO2	NITROUS OXIDE (FT^3/LT)	P1 PRESS. (psig.)
24.51139	29.73338	30.34281		24.5688	0
23.84533	29.05061	29.64243		23.86245	10
23.34054	28.53307	29.11597		23.34036	20
22.92151	28.1036	28.68201		23.06396	30
22.55656	27.73047	28.30646		22.80292	40
22.22913	27.39659	27.9714		22.48045	50
21.92899	27.09208	27.66618		22.23476	60
21.65028	26.80975	27.38398		21.86623	70
21.38815	26.54586	27.12011	22.30283	21.58983	80
21.13965	26.29665	26.87116	22.12479	21.40557	90
20.90187	26.06006	26.63458	21.95725	21.25201	100
20.67384	25.83373	26.40907	21.79865	21.06775	110
20.45312	25.61626	26.19209	21.64807	20.91419	120
20.23922	25.40665	25.98322	21.50367	20.79135	130
20.03068	25.20387	25.78073	21.36512	20.69921	140
19.82652	25.00689	25.58421	21.23183	20.60708	150
19.62675	24.81503	25.39324	21.10285	20.48424	160
19.4299	24.62795	25.20695	20.97789	20.33068	170
19.23549	24.44462	25.02451	20.85662	20.20784	180
19.04303	24.26506	24.84589	20.73844	20.11571	190
18.85203	24.0889	24.67026	20.62335	20.02357	200
18.66249	23.91548	24.49805	20.51073	19.96215	210
18.47344	23.74444	24.32796	20.40057	19.90073	220
18.28488	23.5758	24.16043	20.29258	19.8086	230
18.09583	23.40886	23.99503	20.18674	19.68575	240
17.90629	23.24363	23.83134	20.08245	19.59362	250
17.71577	23.0801	23.66935	19.98001	19.47077	260
17.52331	22.9176	23.50864	19.87942	19.34793	270
17.32939	22.75647	23.34921	19.77976	19.2558	280
17.13303	22.59602	23.19106	19.68164	19.13295	290
16.93374	22.43625	23.03334	19.58475	19.01011	300
16.73105	22.27682	22.87689	19.4891	18.91798	310
16.52446	22.11774	22.72045	19.39437	18.79513	320
16.31348	21.95899	22.56485	19.30057	18.67229	330
16.09714	21.7999	22.40926	19.20769	18.54944	340
15.87447	21.64082	22.25409	19.11574	18.4266	350
15.64498	21.48105	22.09893	19.02441	18.33447	360
15.40769	21.32094	21.94333	18.93369	18.21162	370
15.16114	21.16015	21.78774	18.84359	18.08878	380
14.90388	20.99833	21.63129	18.75411	17.99665	390
14.63394	20.83549	21.47442	18.66525	17.8738	400
14.3489	20.67128	21.31712	18.57669	17.78167	410
14.04389	20.50537	21.15897	18.48875	17.65883	420
13.71402	20.33809	20.99954	18.40112	17.53598	430
13.34908	20.16876	20.83883	18.3138	17.44385	440
12.93102	19.99704	20.67685	18.22648	17.33329	450

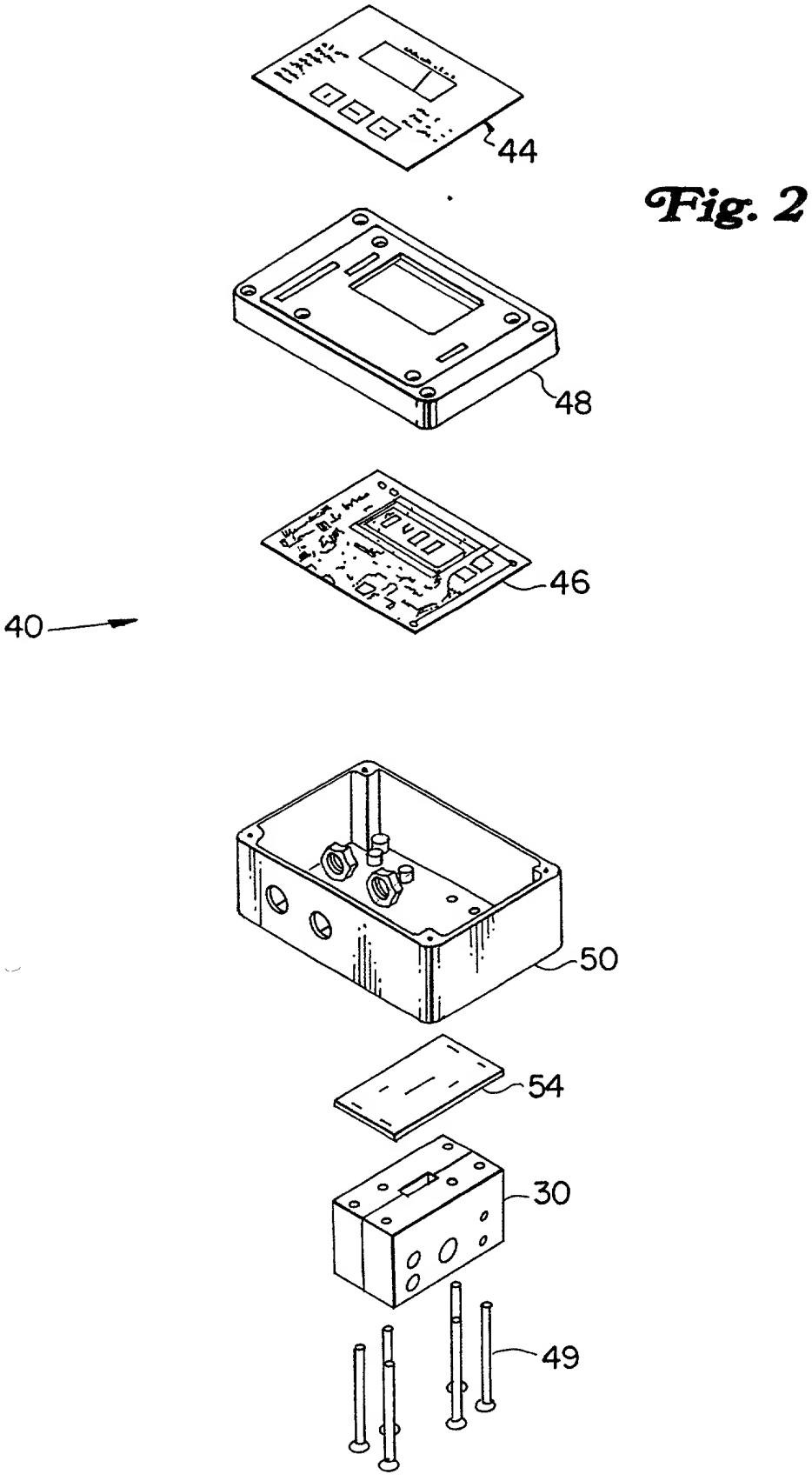


Fig. 2

Fig. 3

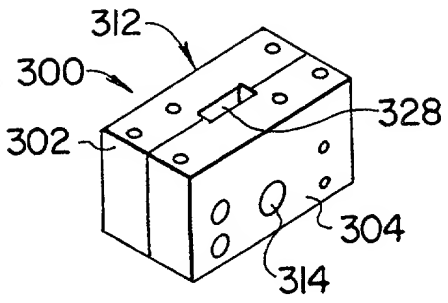
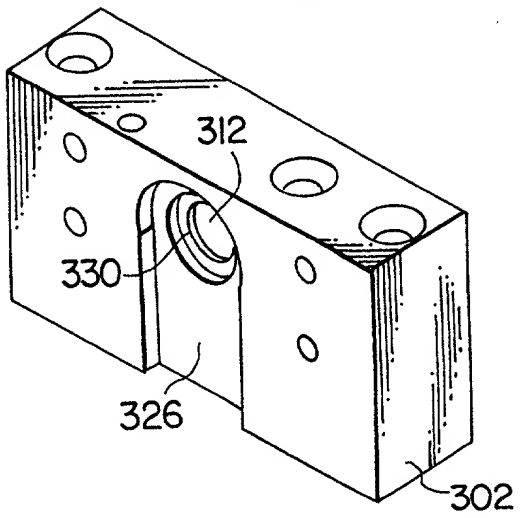


Fig. 4



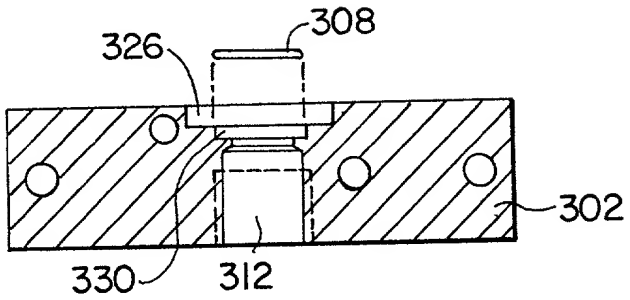


Fig. 5

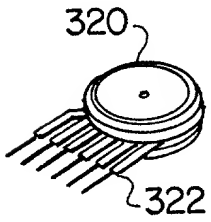


Fig. 6

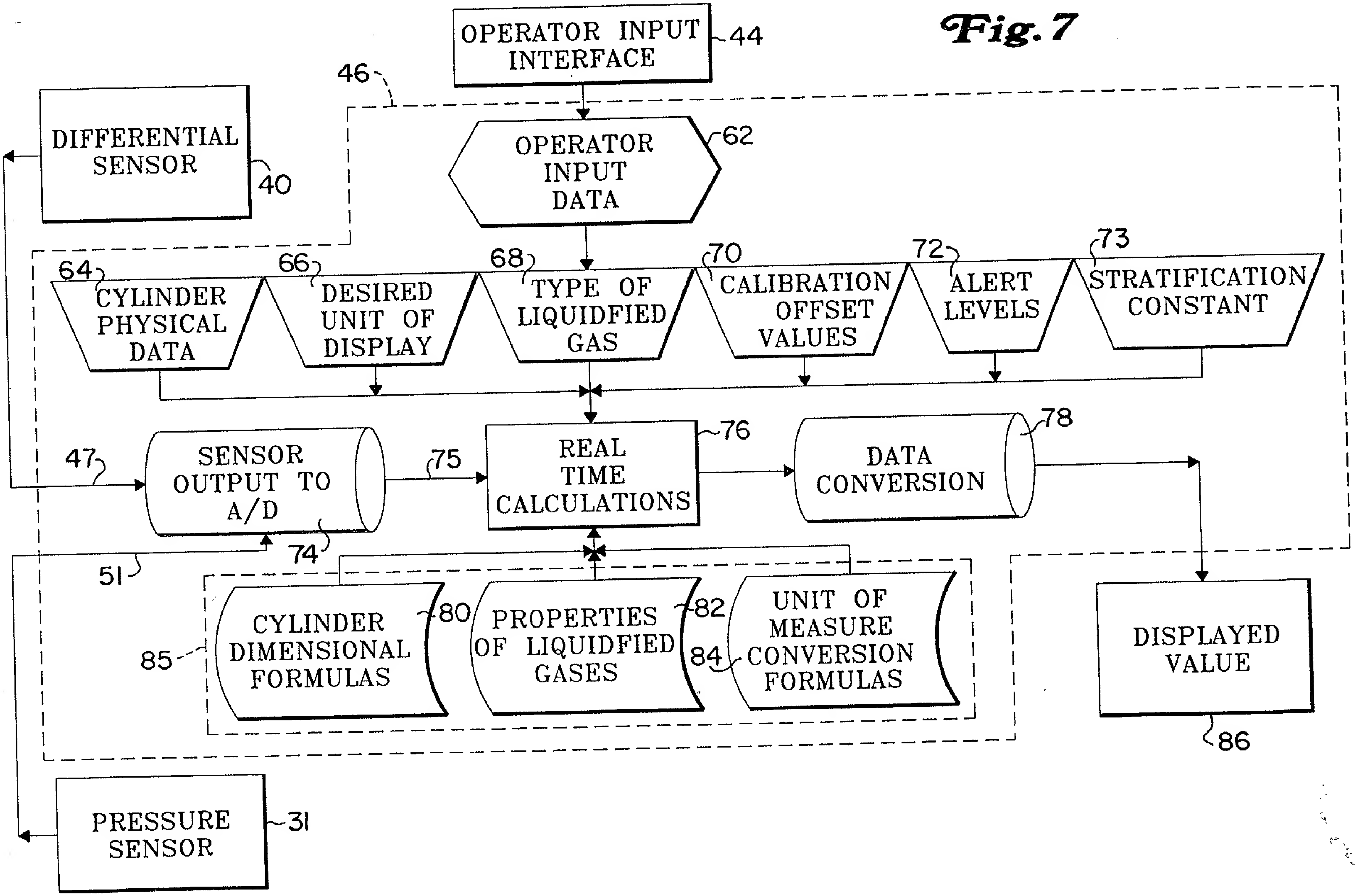

OPERATOR INPUT INTERFACE
44
46
DIFFERENTIAL SENSOR
40
OPERATOR INPUT DATA
62
64
CYLINDER PHYSICAL DATA
66
DESIRED UNIT OF DISPLAY
68
TYPE OF LIQUIDFIED GAS
70
CALIBRATION OFFSET VALUES
72
ALERT LEVELS
73
STRATIFICATION CONSTANT
47
SENSOR OUTPUT TO A/D
75
REAL TIME CALCULATIONS
76
DATA CONVERSION
78
74
51
CYLINDER DIMENSIONAL FORMULAS
80
PROPERTIES OF LIQUIDFIED GASES
82
84
UNIT OF MEASURE CONVERSION FORMULAS
85
DISPLAYED VALUE
86
PRESSURE SENSOR
31

Fig. 7

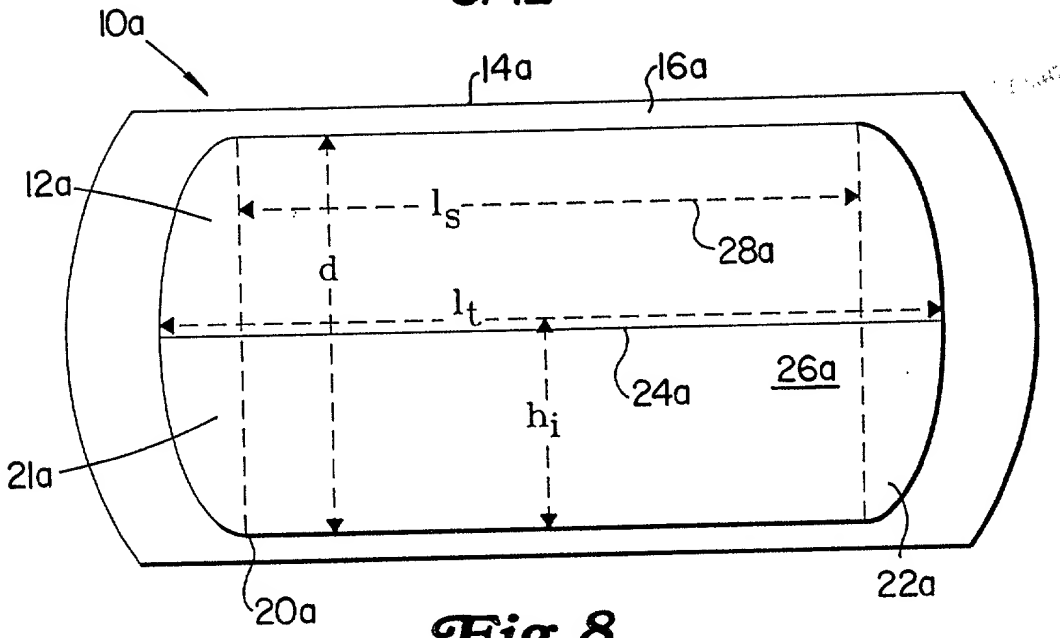

10a
14a
16a
12a
l_s
28a
d
l_t
24a
26a
h_i
21a
20a
22a

Fig. 8

Fig. 9A

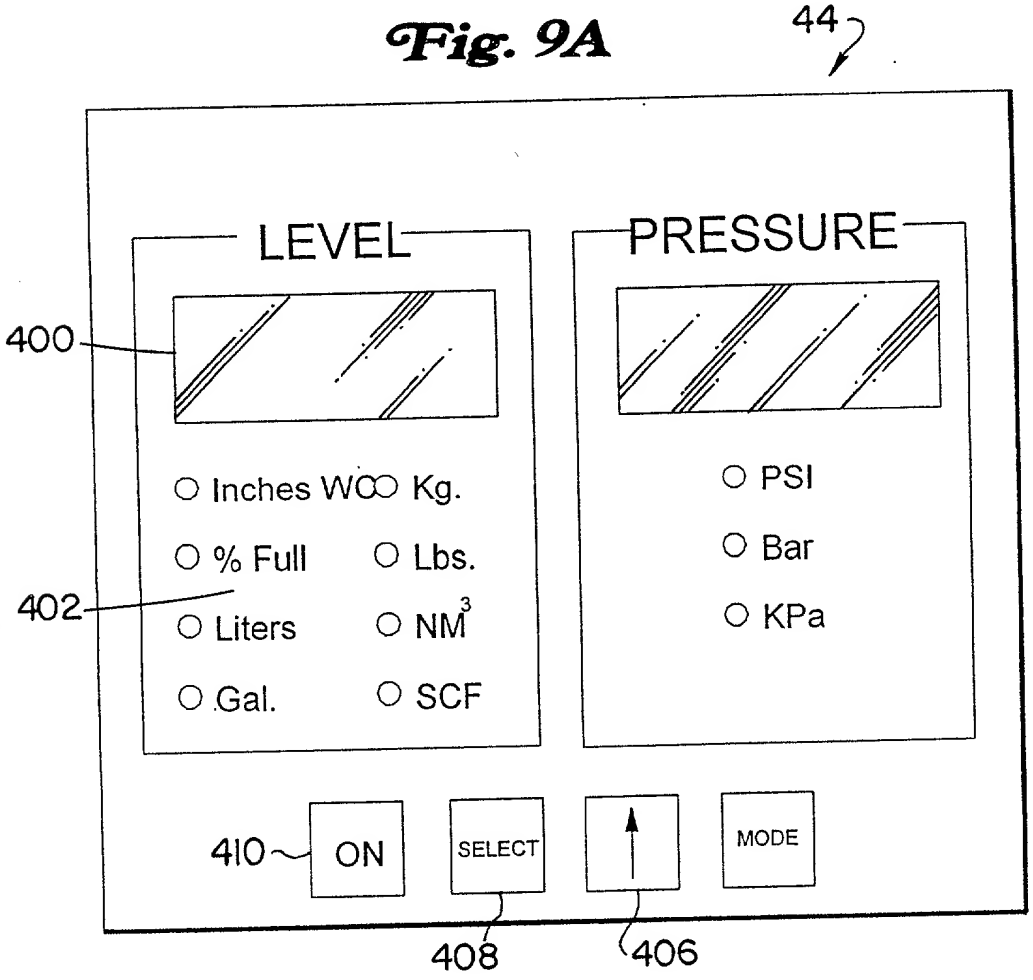
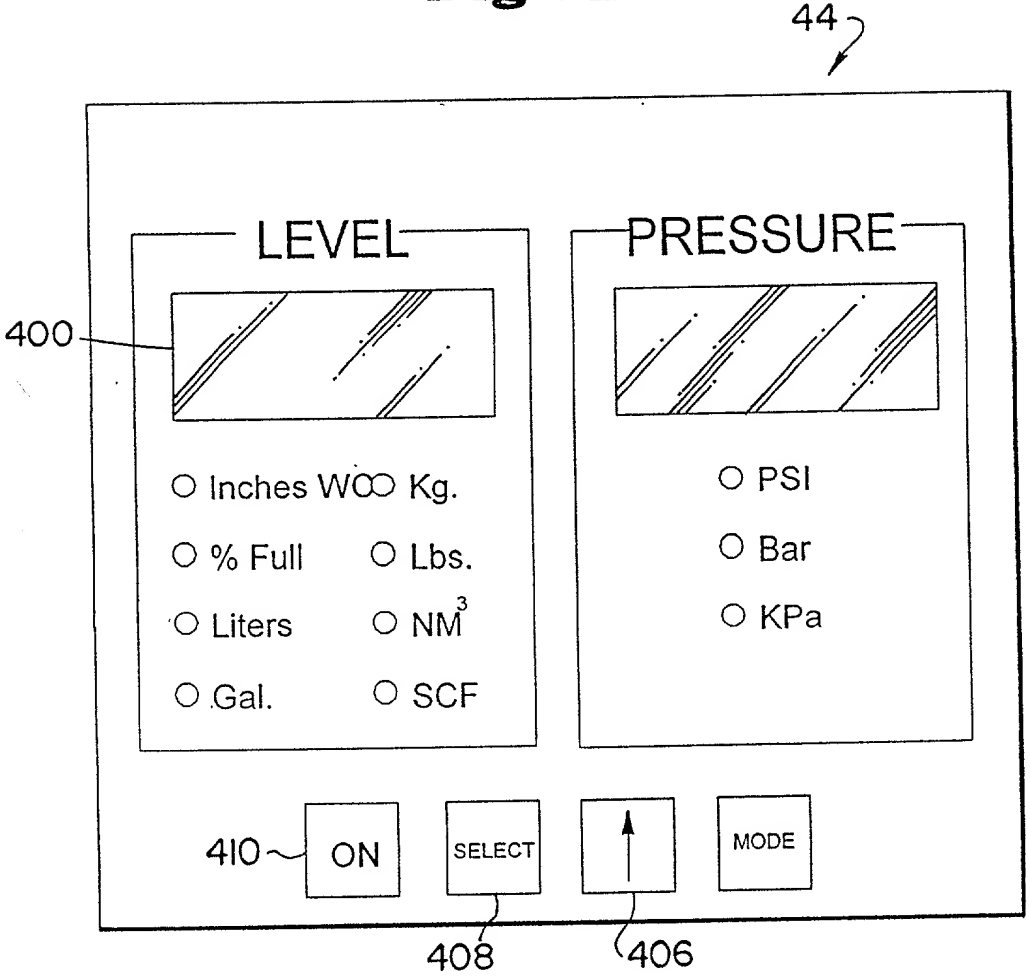

44
LEVEL
PRESSURE
400
Inches WC
Kg.
% Full
Lbs.
402
Liters
NM^3
Gal.
SCF
PSI
Bar
KPa
410
ON
SELECT
MODE
408
406

Fig. 9B


44
LEVEL
PRESSURE
400
Inches W.C.
Kg.
% Full
Lbs.
Liters
NM3
Gal.
SCF
PSI
Bar
KPa
410
ON
SELECT
MODE
408
406

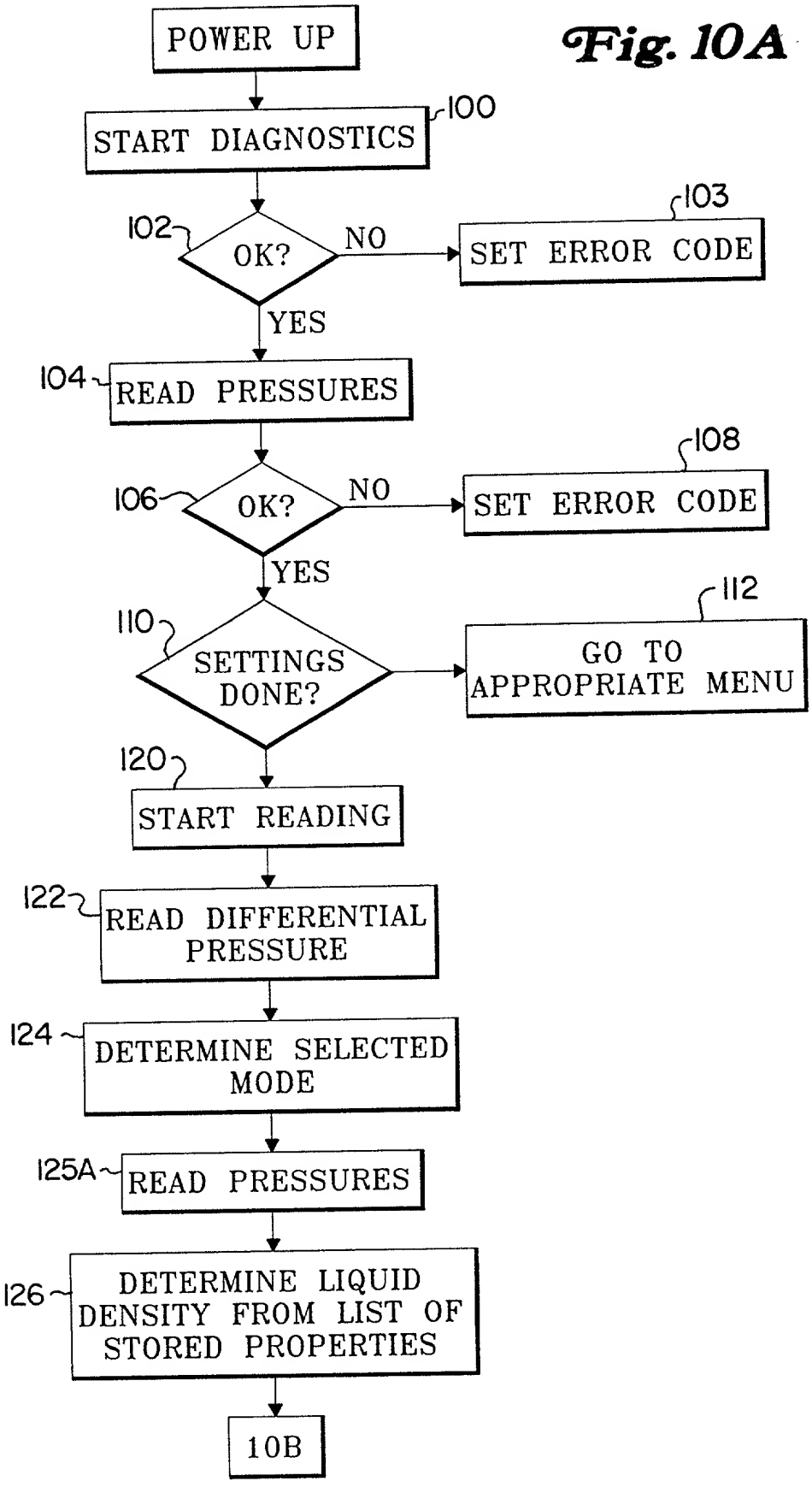

POWER UP
START DIAGNOSTICS
100
102
OK?
NO
103
SET ERROR CODE
YES
104
READ PRESSURES
106
OK?
NO
108
SET ERROR CODE
YES
110
SETTINGS DONE?
112
GO TO APPROPRIATE MENU
120
START READING
122
READ DIFFERENTIAL PRESSURE
124
DETERMINE SELECTED MODE
125A
READ PRESSURES
126
DETERMINE LIQUID DENSITY FROM LIST OF STORED PROPERTIES
10B

Fig. 10A

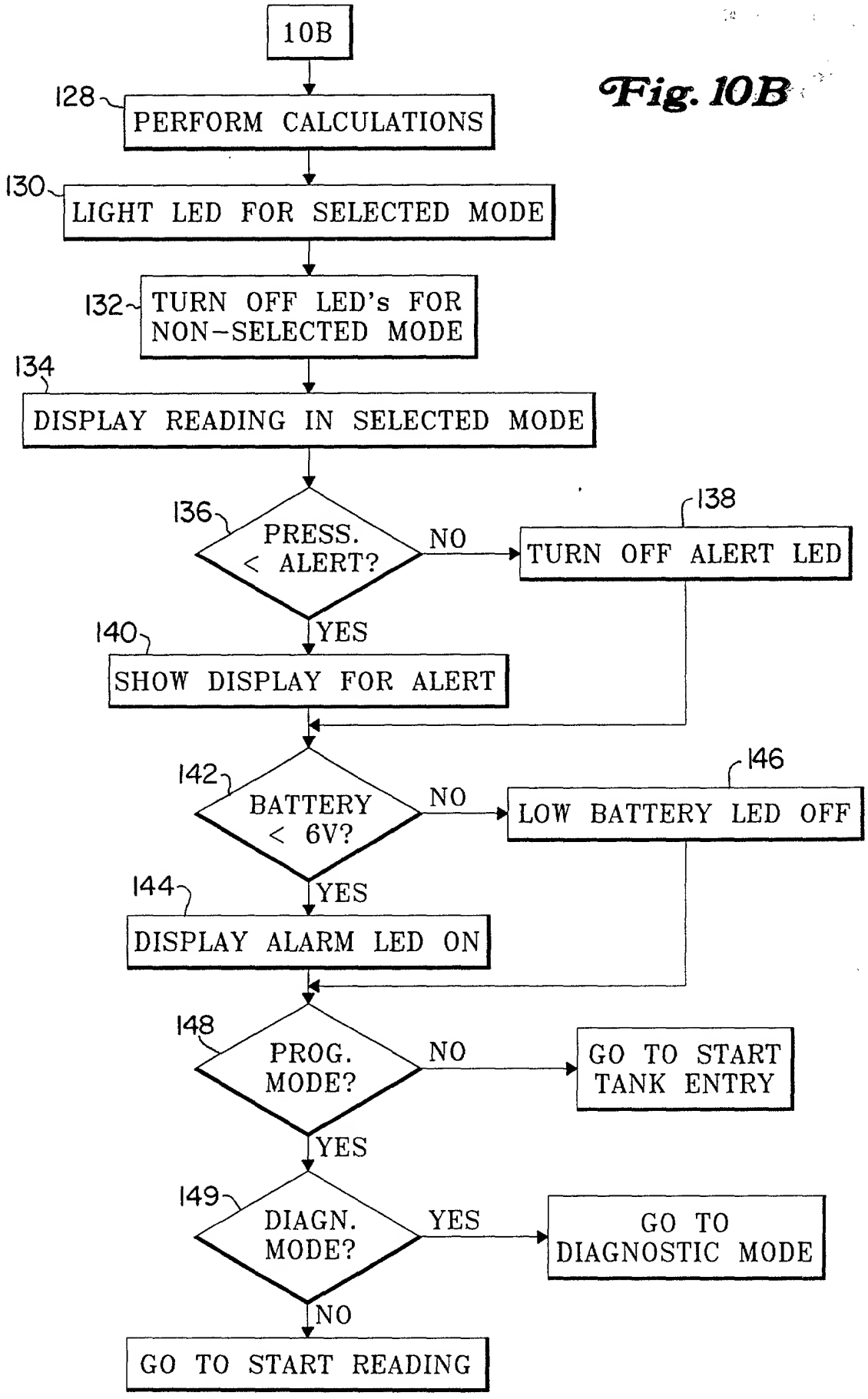
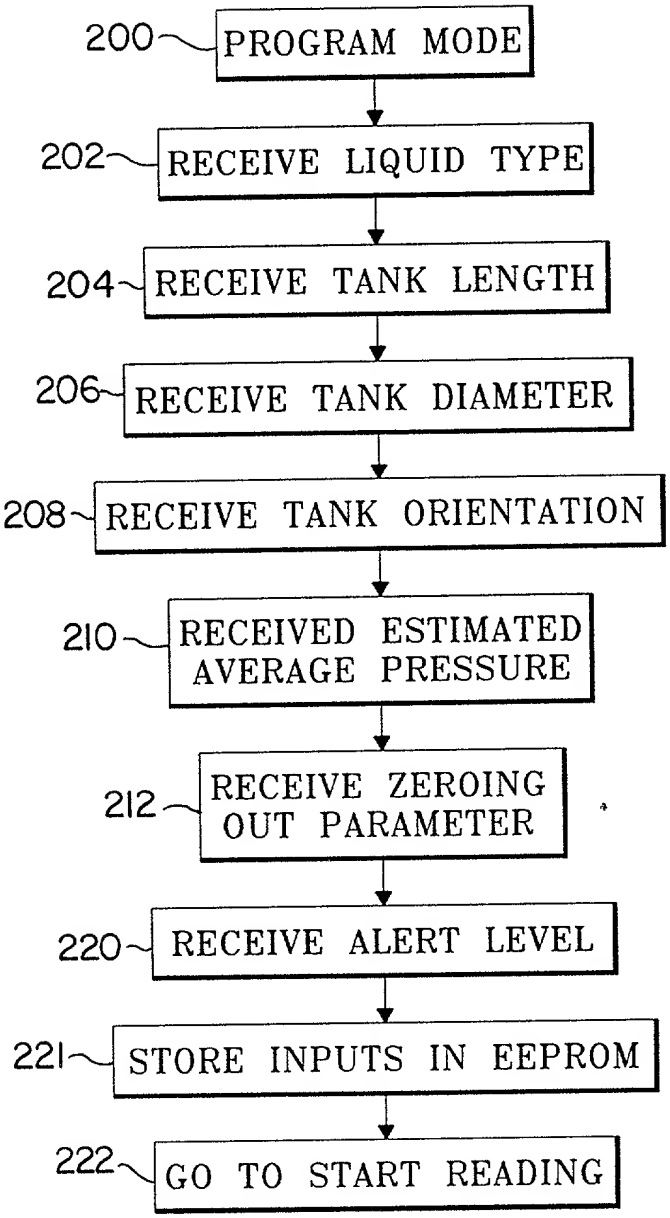

10B
128
PERFORM CALCULATIONS
130
LIGHT LED FOR SELECTED MODE
132
TURN OFF LED's FOR NON-SELECTED MODE
134
DISPLAY READING IN SELECTED MODE
136
PRESS. < ALERT?
NO
138
TURN OFF ALERT LED
YES
140
SHOW DISPLAY FOR ALERT
142
BATTERY < 6V?
NO
146
LOW BATTERY LED OFF
YES
144
DISPLAY ALARM LED ON
148
PROG. MODE?
NO
GO TO START TANK ENTRY
YES
149
DIAGN. MODE?
YES
GO TO DIAGNOSTIC MODE
NO
GO TO START READING

Fig. 10B

Fig. 11


200
PROGRAM MODE
202
RECEIVE LIQUID TYPE
204
RECEIVE TANK LENGTH
206
RECEIVE TANK DIAMETER
208
RECEIVE TANK ORIENTATION
210
RECEIVED ESTIMATED AVERAGE PRESSURE
212
RECEIVE ZEROING OUT PARAMETER
220
RECEIVE ALERT LEVEL
221
STORE INPUTS IN EEPROM
222
GO TO START READING